ACoRN

ARC Communications Research Network

Newsletter August 2005

Convenors Report

Lars K. Rasmussen
ACoRN Network Convenor

Welcome to the third 2005 issue of the ACoRN Newsletter. ACoRN has now had a few successful events and visits under the belt, and has an exciting September coming up with an array of events and visitors. The ACoRN Workshop on Cross-layer Design went very well with more than fifty "happy customers". Likewise, the ACoRN-NICTA Wireless Winter School was a great success, providing useful overviews for the more than forty students attending.

In addition, ACoRN has hosted its first international visitor, namely Prof. Leandro de Haro from the Universidad Politécnica de Madrid, Spain. Prof. Haro is a recognised expert in antenna design for satellite communication systems and has been visiting University of Wollongong for seven weeks. Dr. Emanuele Viterbo from Politecnico di Torino, Italy is visiting Dr. Albert Guillen i Fabregas at UniSA, working on algebraic coding for the fading channel. This visit is part of the ACoRN-NEWCOM collaboration

ACoRN Events in September

Following up on the ACoRN success so far, September offers three big events, namely a work shop, an International Symposium and a spring school.

Almost 600 researchers and students from all around the world will attend the ISIT in Adelaide, including almost 70 Australians. Two ACoRN events are organised on either side of the ISIT. Prior to the symposium, CUBIN and ACoRN are jointly organising a workshop in Melbourne featuring thirteen internationally renowned researchers, presenting their latest results in information and communications theory. Following ISIT, ACoRN is presenting a Spring School in Information and Coding Theory, featuring Prof. David Tse (Uni. Berkeley), Dr. Gerhard Kramer (Bell Labs), and Dr. Emanuele Viterbo (Politecnico di Torino). So far, more 58 students have registered for the Spring School.

ACoRN Advisory Board Meeting

The ACoRN advisory board, Prof. Sergio Verdu (Princeton Uni.), Prof. Sergio Benedetto (Politecnico di Torino), Prof. Desmond Taylor Uni Canterberry), Dr. Chris Nicol (Agere Systems Australia, Prof. Robert Williamson (NICTA) will meet in person in connection with the ISIT. They will evaluate the current programs and events of ACoRN, and give advice regarding future directions.

In November, the ARC is hosting a Network Convenor Workshop where all the convenors from the 24 ARC research networks will discuss common issues and exchange experiences.

The ACoRN Website

The new and improved ACoRN website will be released in early September. Among other additions, the new site will feature an online application submission system, a user-friendly interface for updating personal data, and a much nicer layout and organisation for providing the best possible information service to the ACoRN members. You will be informed as soon as we go 'live'.

ACoRN-NEWCOM Workshop

The ACoRN/NEWCOM collaboration is up and running with three NEWCOM visitors arriving in September and more in October. The first Joint Committee meeting is scheduled for August 31, where further avenues for collaborations will be initiated. An organisation committee for the first ACoRN/NEWCOM workshop will be selected. The workshop will be held in Europe in late September 2006 during the mid-semester break. ACoRN will provide extensive funding to make sure a significant number of ACoRN members are represented at this important workshop.

Domestic and International Research Visits

In comparison with other ACoRN activities, the domestic and international travel scholarship and fellowships are not as popular with the ACoRN members. Since a significant objective of ACoRN is to network Australia, I would like to strongly encourage researchers and students to apply for

travel funding within these programs. The intention of the programs is to facilitate 3-6 weeks research visits to relevant ACoRN organisations. ACoRN will look favourably on such applications for visits in 2005.

Visitors

Iain Collings and Matt Mackay from Uni Sydney visited Alex Grant at UniSA in July, working on capacity for MIMO systems over fading channels.

Iain Collings and Allen Chuang from Uni Sydney visited Lars Rasmussen at UniSA in June, working on ARQ protocols over fading channels.

Lavy Libman from the NPC program in NICTA visited Lars Rasmussen at UniSA in June, working on error control strategies for wireless resource-limited devices.

Fredrik Brannstrom from Chalmers University of Technology, Sweden and Alexandre Graell i Amat from Politecnico di Torino, Italy are visiting Lars Rasmussen and Alex Grant at UniSA in September as part of an ACoRN-NEWCOM collaboration. The collaboration is in the area of optimal design of multiple serially concatenated coding.

Elisabeth Uhlemann from Volvo Technology Corporation and Halmstad University, Sweden is visiting Lars Rasmussen at UniSA in October, working on ARQ protocols for real-time communications.

Emanuele Viterbo from Politecnico di Torino, Italy is visiting Albert Guillen i Fabregas at UniSA in August, working on algebraic coding for the fading channel.

Emmanuel Oluremi Bejide from University of Capetown, South Africa is visiting Lars Rasmussen in November, working on iterative decoding strategies for multiuser systems.

Visits

Albert Guillen i Fabregas from UniSA visited Joseph Boutros at ENST Paris in July, working on coding strategies for fading channels.

Lars Rasmussen from UniSA is visiting Bernard Fleury at Aalborg University in November, presenting a short course in multi-user detection and decoding. This collaboration is part of the ACoRN-NEWCOM collaboration.
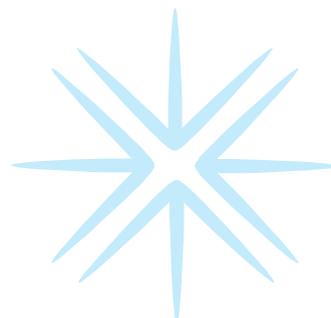
ACoRN Member Profile

Siew-Lee Hew

utilisation, throughput and capacity, which often requires the installation of new infrastructure. In addition, provisioning a network so that it can always meet its peak demand is costly as there are vast differences between peak and off-peak demand patterns, resulting idle capacity to exist much of the time. Dynamic pricing has been proposed as an alternative solution to influence the way users utilise network resources and especially to allocate limited resources to users who value them most. The focus of our research has been placed on integrating dynamic pricing with radio resource management strategies, such as call admission control and resource allocation, with the objective of developing optimal policies that are effective in congestion control and revenue optimisation.

Siew-Lee Hew graduated from the University of Adelaide with a Bachelor of Engineering in Information Technology and Telecommunications (First Class Honours) at the end of 2001. She worked as a Software Engineer with Motorola Corporation Australia from 2002 to 2003. Siew-Lee is currently undertaking her PhD candidature with the Centre for Internet Research (CIR) at the same university and the CRC for Smart Internet Technology. She is working under the supervision of Prof. Lang White, Dr. Paul Chapman and Dr. Matthew Sorell. The title of her thesis is "Wireless Optimisation based on Economic Criteria".

The scarcity of air interface resources necessitates researchers to find technological solutions to increase spectral efficiency. Current solutions focus on the optimisation of parameters like

To date, we have developed an optimal integrated call admission control and dynamic pricing policy for hard-capacity networks. Our model incorporates handoffs and price-affected behaviour of network users, considering the effects of resource price on arrivals, retrials and substitutions. This work has since been extended to soft-capacity networks. In order to overcome the "curse of dimensionality" associated with the extraction of optimal policy for problems with large state spaces, we applied a simulation-based learning method (i.e. Neuro-Dynamic Programming) with feature extraction to solve the problem. The current focus of the research is on the capacity trading games among noncooperative network operators and mobile virtual network operators (MVNOs) in shared networks and the use of pricing to encourage cooperation.

Congratulations to ACoRN Members

Professor Harry Green was awarded a Doctor of Engineering from the University of Adelaide for a compendium of research papers entitled "Some Contributions to Engineering Electromagnetics"

Prof. Green's work in numerical electromagnetics, spanning some 45 years, has been characterized by commitment to the principle that truly significant research advances are underpinned by a deep understanding of the physical principles that apply to a problem.
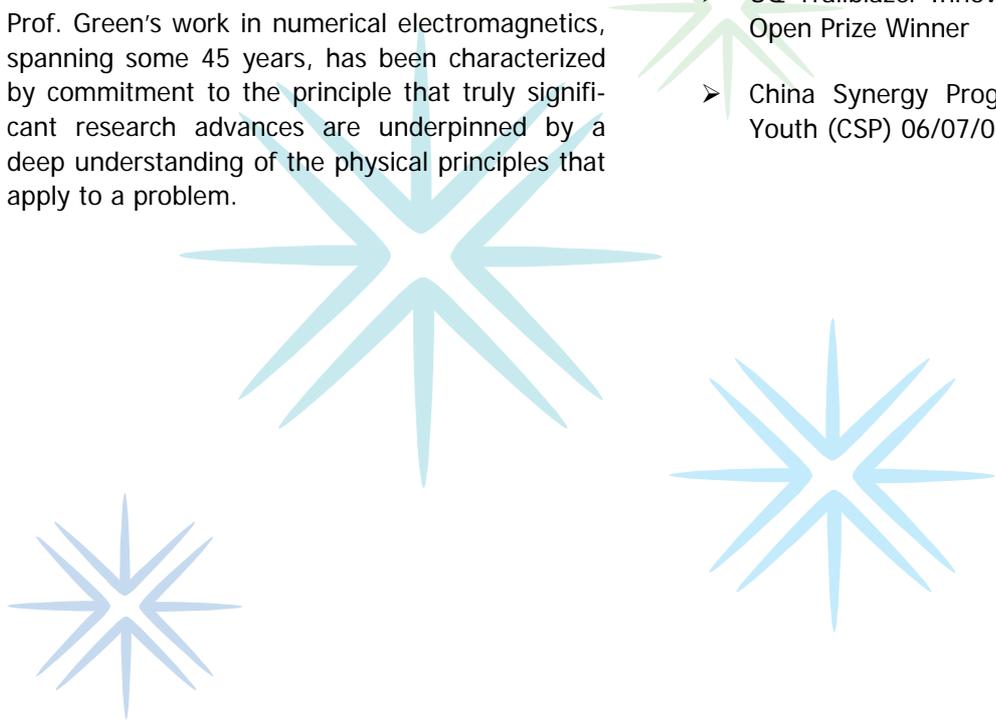
Wia Yie LEONG's was announced Winner of the Postgraduates Student's category for QLD Smart State Smart Woman Award.

Wai Yie has also won a postdoctoral position (starts Oct'05) in the Communications and Signal Processing Group, Dept. of Electrical and Electronic Engineering Imperial College London.

Wai Yie has also gained outstanding results in the following programs:-

➢ UQ Trailblazer Innovation Competition 2005 – Highly Recommended

➢ UQ Trailblazer Innovation Competition 2004 - Open Prize Winner

➢ China Synergy Programme For Outstanding Youth (CSP) 06/07/04 – 22/07/04

Workshop Reports

NICTA-ACORN Inaugural Wireless Winter School (WWS)

http://wws2005.rsise.anu.edu.au

The inaugural NICTA-Acorn Wireless Winter School (July 11 - 15) was an open and informal week for students and researchers alike, with an interest in Communications and Signal Processing. Co-chaired by Mark Reed and Leif Hanlen from the Wireless Signal Processing Program, the WWS presented core topics for modern Communication systems, and future research directions in the form of Tutorials (1/2 day & full day) and Invited Talks, providing a broad range of related topics to inspire, motivate, and enlighten. The school was sponsored by the National Institute for Engineering and Information Science, NICTA and the Research School of Information Science and Engineering.

Prof. Bob Williamson opened the school with his talk "Signal Processing, Information Theory and Machine Learning," setting the scene of multidisciplinary talks for the rest of the week, amongst leading academic researchers from across Australia, the WWS also showcased new tools, from Mathematica and Matlab, Roslyn Hughes, from Epicorp, on the Path toward Entrepreneurship.

The WWS Poster Session saw several of the student participants demonstrating their research and encouraged networking and collaboration between students. The Student Poster Prize was won by Siew Lee-Hew, from the University of Adelaide. Siew's prize is a funded trip to Canberra to work with WSP researchers.

There was 46 student attendees, with students attending from around Australia, the presenters were all researchers from Australia.

The school was an excellent opportunity for students, researchers and industry representatives alike. It received great positive feedback, from all attendees and is to become an annual event.

Mark Reed

ASWN 2005 Workshop

http://www.int-evry.fr/aswn/

ASWN 20002 is the 5th workshop on Applications and Services in Wireless Networks. The main topic of this year workshop focused on the impact of newly emerging technologies, such as sensor networks, embedded systems, systems on chip, and nanotechnologies, on wireless applications and services. The format of the workshop was a three-day single-track sessions, with presentations of peer-reviewed papers from academia and industry, and invited talk from Remy Bayou, Project Officer, Mobile and Wireless Communications, European Commission, DG INFSO.

Having attended the workshop, I believe the following benefits have been gained:

Presenting our paper to the academic and industry researchers, and thus making the name "Institute for Telecommunications Research" and "UniSA" familiar to the academic and industry circles, especially European academic societies.

Getting more experience in giving presentation at international academic conferences.

Meeting, discussing and exchanging ideas with other experts in the field of wireless communications.

Establishing relationship with researchers from universities in other countries for future exchange programs and cooperation.

Having a good relaxation time after hard working on the research.

Quang-My Tran

Graduations, Appointments and Opportunities

Promotions

Adrian Barbulescu at UniSA has been promoted to Associate Professor. Congratulation to Adrian.

Graduating Postgraduate Students

Tao (Tony) Lin has graduated with his Master's by Research from UniSA with the thesis entitled *"Maximal Ratio Combining for Iterative Multiuser Decoding,".* The work was supervised by Lars Rasmussen. Tony is now working as a research engineer at NEC Australia, Clayton, Victoria.

Adriel Kind has graduated with his Ph.D. from UniSA with the thesis entitled *"Iterative APP list detection for multi-dimensional channels".* The work was supervised by Alex Grant. Adriel is now working as a research engineer at Agere Systems Australia, North Ryde, New South Wales.

Julija Tovirac has graduated with her Ph.D. from UniSA with the thesis entitled *"Error control for message multicast over wireless links".* The work was supervised by Weimin Zhang, from DSTO and Sylvie Perreau, UniSA. Julija is now working at BAE Systems Australia, Canberra as a research engineer.

Aaron Reid has graduated with his Ph.D. from UniSA with the thesis entitled *"Detection algorithms for multiple access and multiple antenna channels".* The work was supervised by Alex Grant. Aaron is now working at Victoria University as a research fellow.

New Appointments

Dr. Iain Collings has started as the Science Leader for Communications & Signal Processing at the ICT Centre CSIRO with effect on 16 August 2005. We wish Iain the best of luck in his new position at CSIRO. Iain's new contact details are as follows:

Dr. Iain Collings
Science Leader –
Communications & Signal Processing
ICT CentreCSIRO
P.O. Box 76
Epping NSW 1710
ph. (02) 9372 4120
iain.collings@csiro.au

Dr. Predrag Rapajic has started as the Chair of Communication Systems at the University of Greenwich, London, United Kingdom. We wish Predrag the best of luck in his new position overseas and look forward to his continuing involvement with ACoRN and with research in Australia.

Agere Internships

Paid summer student internships with Agere Systems Australia. The deadline for applications has been extended until 4th September.

For further details please refer to the full advertisement

http://www.acorn.net.au/positions/agere/internship

Call for papers

Due Date	Event Name
15 Sept 05	ICC 2006 http://www.icc2006.org
16 Sept 05	VTC 2006 http://www.vtc2006spring.org
17 Oct 05	Turbo Coding Symposium 2006 http://www.turbo-coding-2006.org
30 Oct 05	AusCTW2006 http://ausctw06.watri.org.au
14 Nov 05	AusWireless 2006 http://epress.lib.uts.edu.au/conference/auswireless2006

Coming Events

Event Date	Event Name
1-2 Sept 05 Melbourne	CUBIN/ACoRN Information Theory Workshop
4-9 Sept 05 Adelaide	IEEE International Symposium on Information Theory (ISIT)
12-16 Sept 05 Adelaide	ACoRN Spring School 2005 Coding Information Theory
3-5 Oct 05 Perth	Asia-Pacific Conference on Communications
24-28 Oct 05 Paris	NEWCOM Autumn School, Estimation theory for wireless communications - new trends

For a complete list of coming events, or reports on past events, see the event calendar.

Newsletter Items

If you have recently graduated, received an award, read an article that you have found useful, let us know so that we can share it with other ACoRN members. Please forward newsletter contributions directly to ACoRN Network Administrator christine.thursby@unisa.com.au

Contact Us

If you have any queries about anything in the newsletter or any other related ACoRN information please visit the ACoRN website for full contact details at http://www.acorn.net.au/contact